

Air Force Civil Engineer Center

*FORMER
WILLIAMS AIR FORCE BASE*

**Site LF004 Landfill
Remedial Action**

**BCT Conference Call
18 June 2020**



Battle Ready...Built Right!



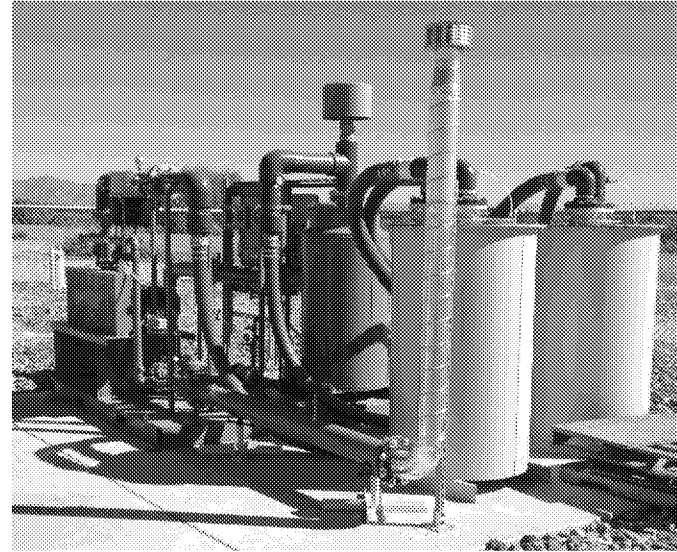
LF004 Recent and Upcoming Activities

- **Draft 2019 landfill inspection report in preparation. Anticipated issue date is 26 Jul 2020.**
- **Planning continues for decommissioning of SVE and IWAS treatment systems. AF response to ADEQ comments regarding SVE and IWAS decommissioning submitted 5 Jun 2020.**
- **Validation of semi-annual (May 2020) analytical data in progress**



LF01-W17 Area IWAS System Update

- Preliminary May 2020 PDB results indicate all monitoring wells below the TCE MCL with the exception of LF01-W17S (9.3 $\mu\text{g/l}$), LF01-W17M (5.8 $\mu\text{g/l}$) and LF01-W30M (10 $\mu\text{g/l}$)
- Previous Nov 2019 PDB for LF01-W17S (7.9 $\mu\text{g/l}$), LF01-W17M (3.8 $\mu\text{g/l}$), and LF01-W30M (10 $\mu\text{g/l}$)
- Residual oxidant measured in May 2020 (0.3 mg/l at W17S; 0.37 mg/l at W17M; 0.02 mg/l at W30M) may not be sufficient to degrade residual PCE concentrations. Additional oxidant injections planned for June 2020.
- Monitoring wells upgradient and downgradient of LF01-W17S, LF01-W17M, and LF01-W30M are below TCE MCL



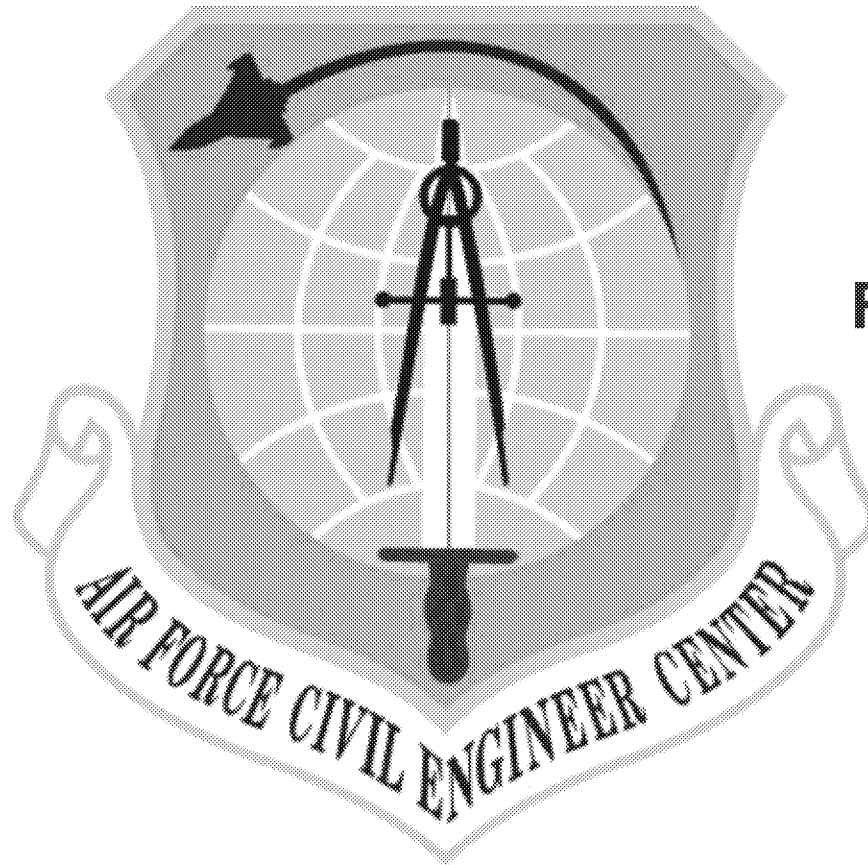


Southern Area SVE and Oxidant Injection

- **Preliminary May 2020 PDB results indicate only four PCE MCL exceedances at two locations: W19S at 8.6 µg/l (dup 9.4 µg/l), W19M 10 µg/l (dup 10 µg/l), W24S at 6.7 µg/l and W24M at 8.8 µg/l**
- **Previous November 2019 PDB results for W19S at 7.8 µg/l (dup 8.2 µg/l), W19M 4.3 µg/l (dup 4.1 µg/l), W24S at 4 µg/l and W24M at 6.2 µg/l.**
- **Residual oxidant measured in May 2020 (0.19 mg/l at W19S; 0.25 mg/l at W19M; 0.28 mg/l at W24S; 0.14 mg/l at W24M) may not be sufficient to degrade residual PCE concentrations. Additional oxidant injections planned for June 2020.**
- **Upgradient wells in the vicinity of W19 and downgradient wells in the vicinity of W24 are below the PCE MCL**

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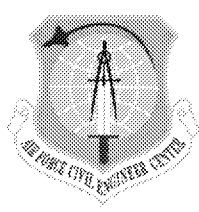
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**Site FT002
Fire Training Area Remedial
Action**

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Site FT002 Update

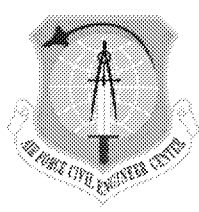
- **AF approved keeping the DEUR in place Nov 2018**
- **Draft Explanation of Significant Differences (ESD) document to add the land use control to the ROD is being revised per legal comments in June 2020**
- **Revised Final Remedial Action Completion Report submitted 22 Nov 2019**
- **Received EPA comment letter on 31 Dec 2019. Received ADEQ comments on 12 Feb 2020. Response to comments under internal AF review.**

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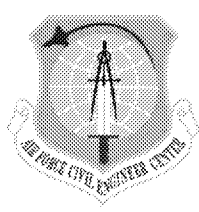
**FORMER
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Site SS017
Old Pesticide/Paint Shop**

**BCT Conference Call
18 June 2020**



Site SS017 Groundwater Monitoring Update

- Draft Q4 (Nov) 2019 annual report submitted for regulatory review 27 Apr 2020
- Draft Q1 (Feb) 2020 data summary report under AF review



Groundwater Monitoring Preliminary Data

- **Dieldrin exceeded the EPA RSL of 0.0018 µg/L in MW02 at 0.130 µg/L (dup 0.13 µg/L), MW03 at 0.023 µg/L, and MW04 at 0.0048 µg/L**
- **Chlordane was detected in MW02 at 0.029 µg/L (dup 0.027 µg/L) and in MW03 at 0.075 µg/L, below the MCL of 2 µg/L**



Parcel K-1-2 Property Transfer

- **FOST (final version in track changes responding to EPA comments) was issued via email for regulatory concurrence 24 Jul 2019 with follow up email 9 Aug 2019**
- **FOST clean copy with all revisions, responses to comment and ADEQ requested changes issued 15 Oct 2019**
- **ADEQ concurrence previously received. EPA concurrence letter received 19 Dec 2019**
- **Final FOST signed by the AF 29 May 2020**
- **AF preparing assignment package**
- **AF to request ADEQ to prepare draft DEUR once assignment package is complete**

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Site ST012

**Former Liquid Fuel
Storage Area**

**BCT Conference Call
18 June 2020**



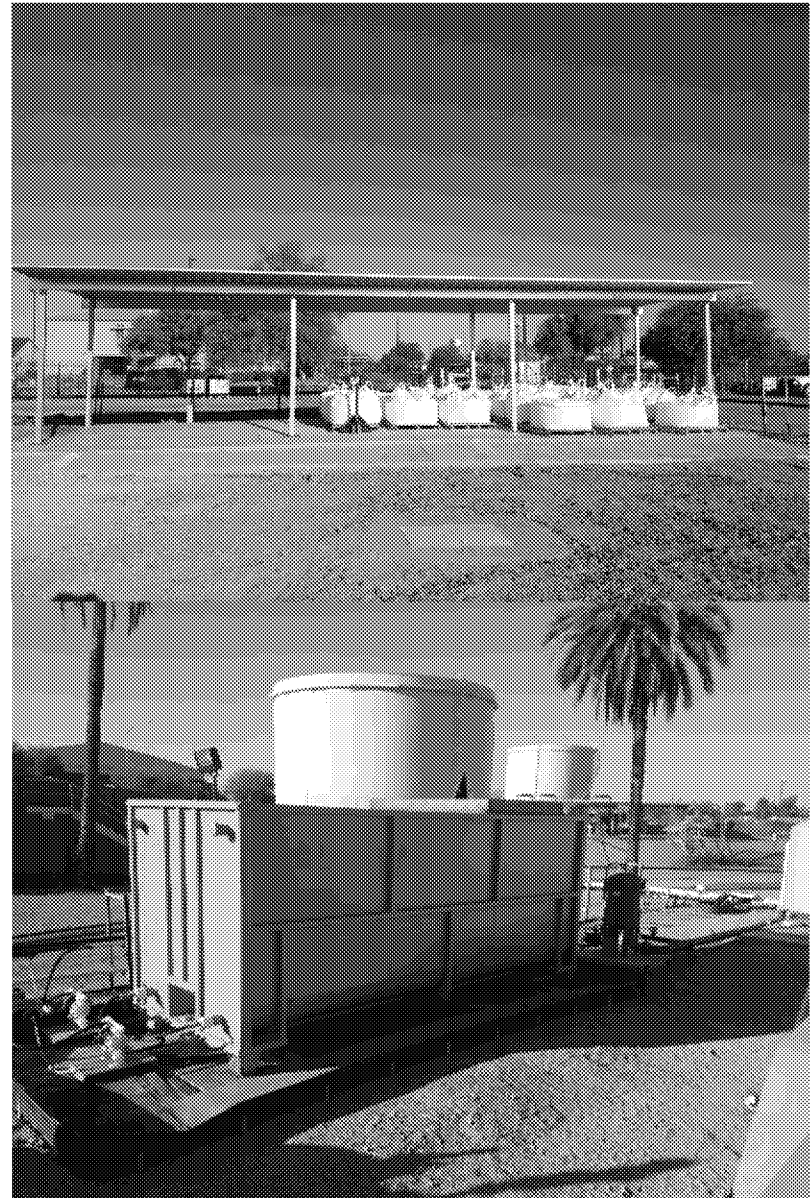
Site ST012 Outline

- **Summary of activities since May BCT call**
- **LNAPL removal update**
- **Update on benzene and sulfate concentrations**
- **Pilot study extraction/injection update, including 2Q 2020 supplemental injections**
- **Path forward**



Site ST012 Activities Since May

- **SVE Rotation on 4 Jun 2020, current status:**
 - Extraction wells: SVE01D, SVE02M, SVE03M, SVE07S, SVE09S, and SVE14(M)
 - Venting wells: SVE01S, SVE01M, SVE03S, SVE03D, SVE04M, SVE07M, SVE07D, SVE11(M), and SVE13(M)
 - Closed wells: SVE02S, SVE02D, SVE04S, SVE04D, SVE05S, SVE05M, SVE05D, SVE06S, SVE06M, SVE06D, SVE08S, SVE08M, SVE08D, SVE09M, SVE09D, SVE10(M), and SVE12(M)
- **LNAPL screening in select wells**
- **Pump Repairs**
 - UWBZ21 continued with limited pumping due to high temperatures
 - LSZ11 wiring was replaced
 - LSZ43 motor replaced

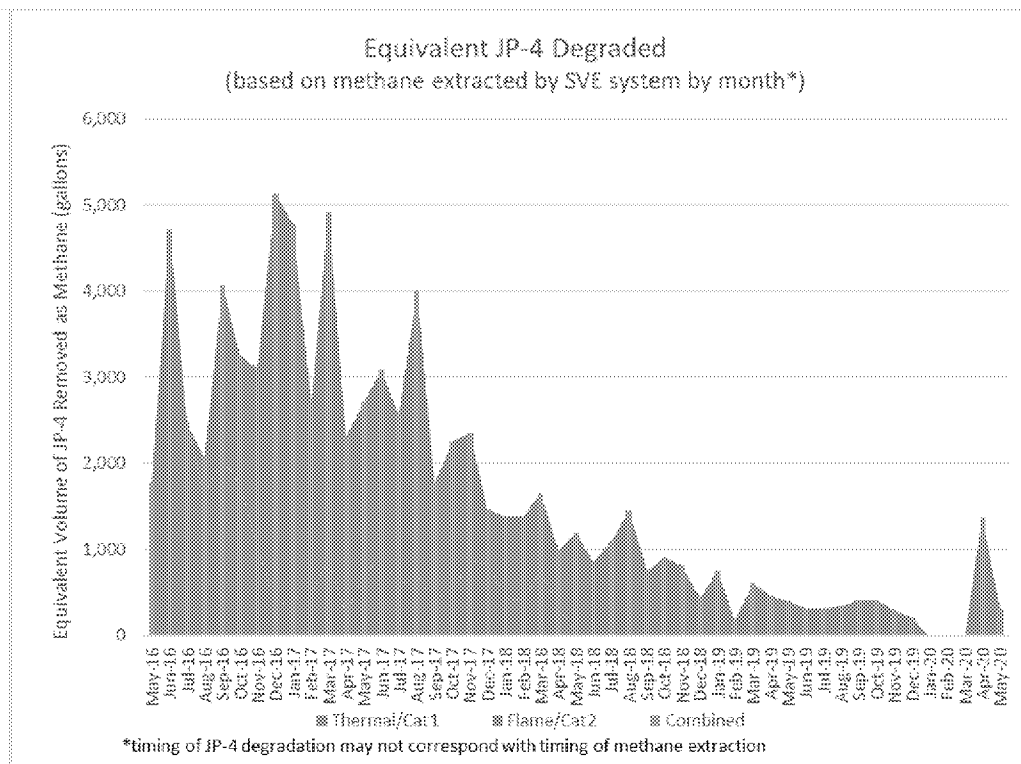
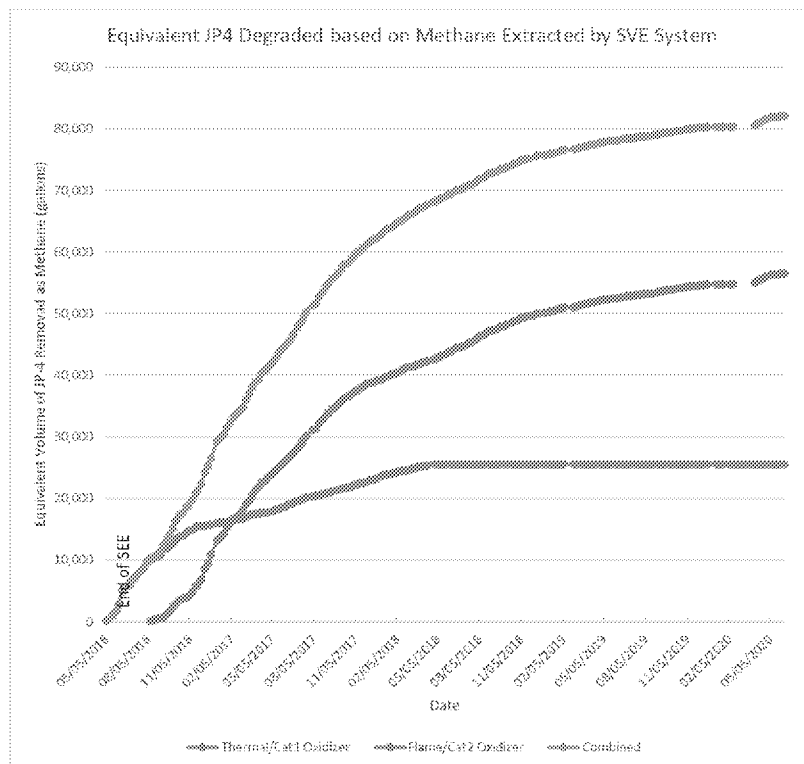




JP-4 Degradation Based on Methane Removed with SVE



Site ST012 SVE System Equivalent JP-4 Degradation Based on Methane Removed



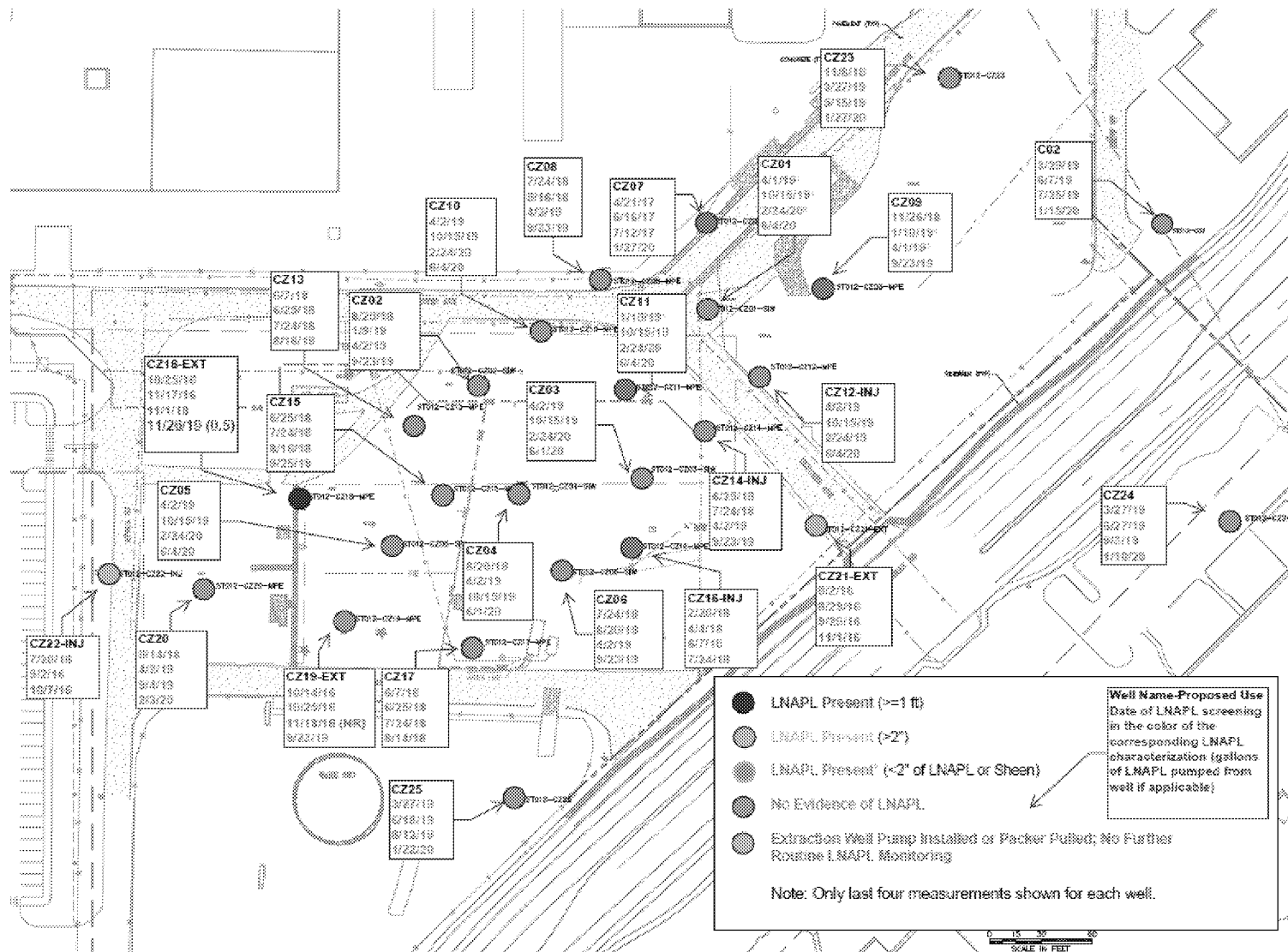
- Estimates through 5 June 2020
- Estimated JP-4 degradation as methane is in addition to JP-4 removal reported for SVE
- Thermal/Cat1 oxidizer changed from SVE to groundwater treatment end of Apr 2018 (low methane concentrations recently observed but attributed to vapor bleed through closed valve from SVE)
- Flame oxidizer treating combined SVE and air stripper intermittently in Nov 2018 – Jan 2019
- Flame oxidizer replaced by catalytic oxidizer (Cat2) 7 Feb to 26 Feb 2019



LNAPL Removal Update (through 04 June)



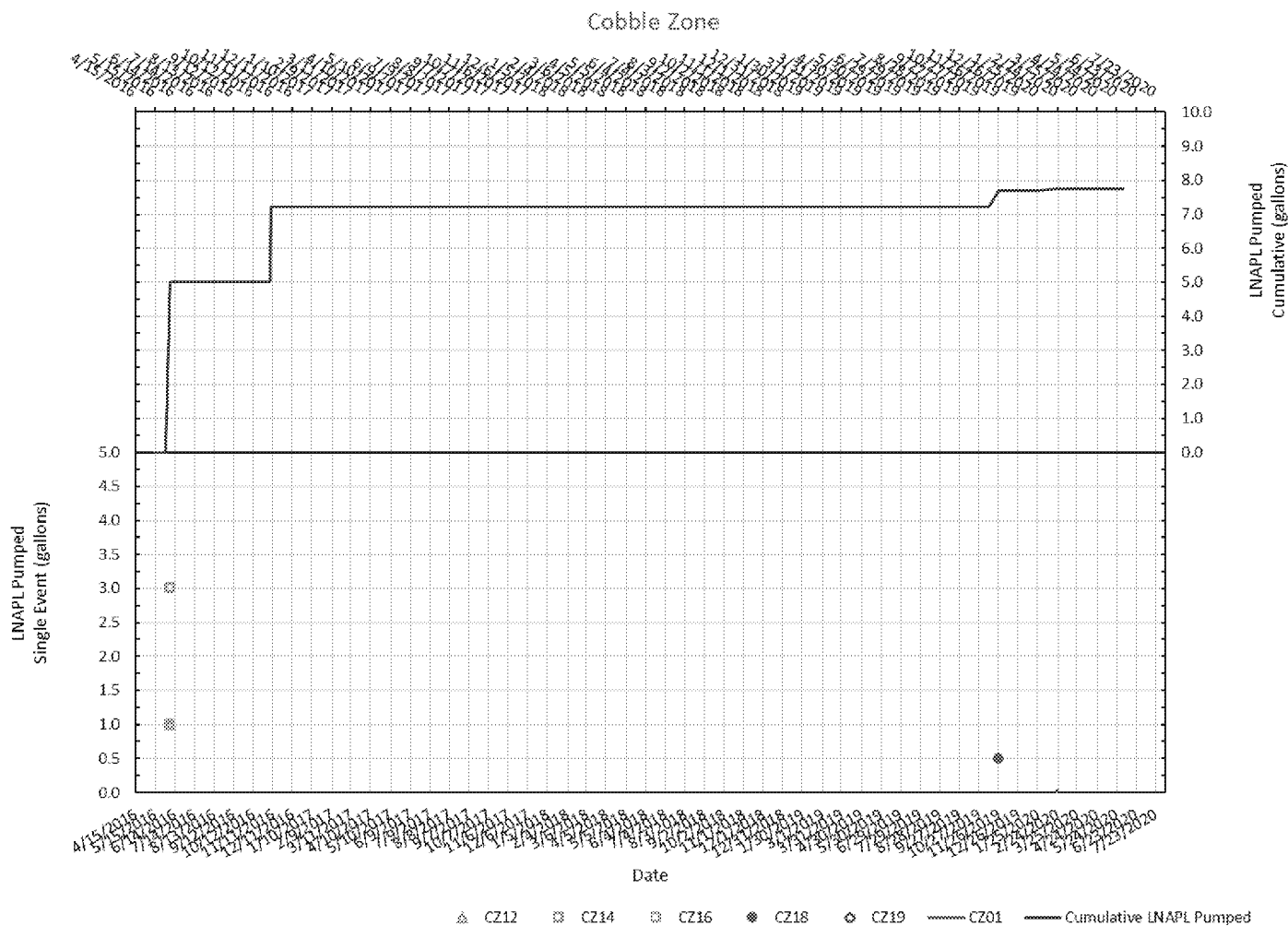
LNAPL Monitoring/Removal Status Cobble Zone





LNAPL Monitoring/Removal Status

Cobble Zone

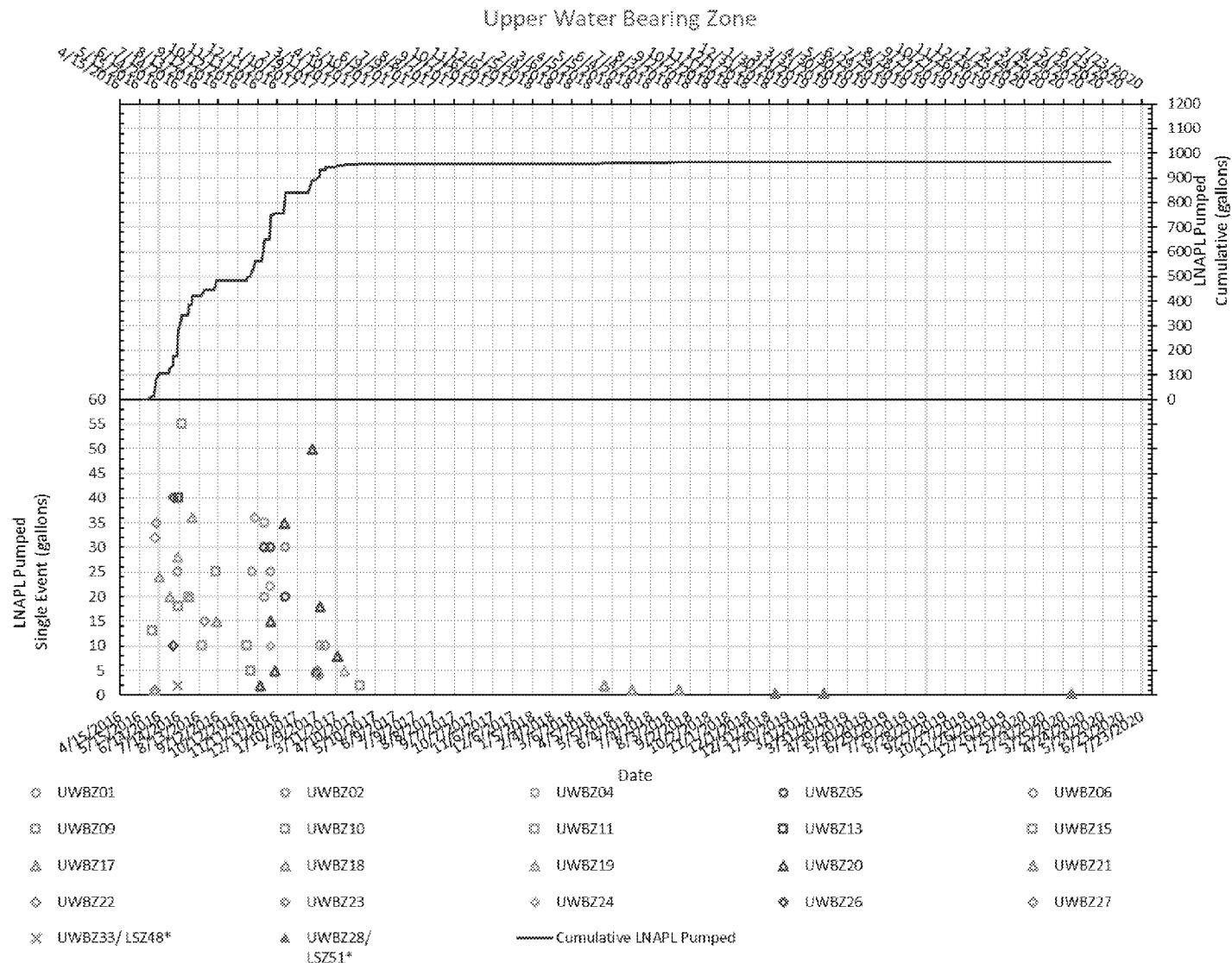






LNAPL Monitoring/Removal Status

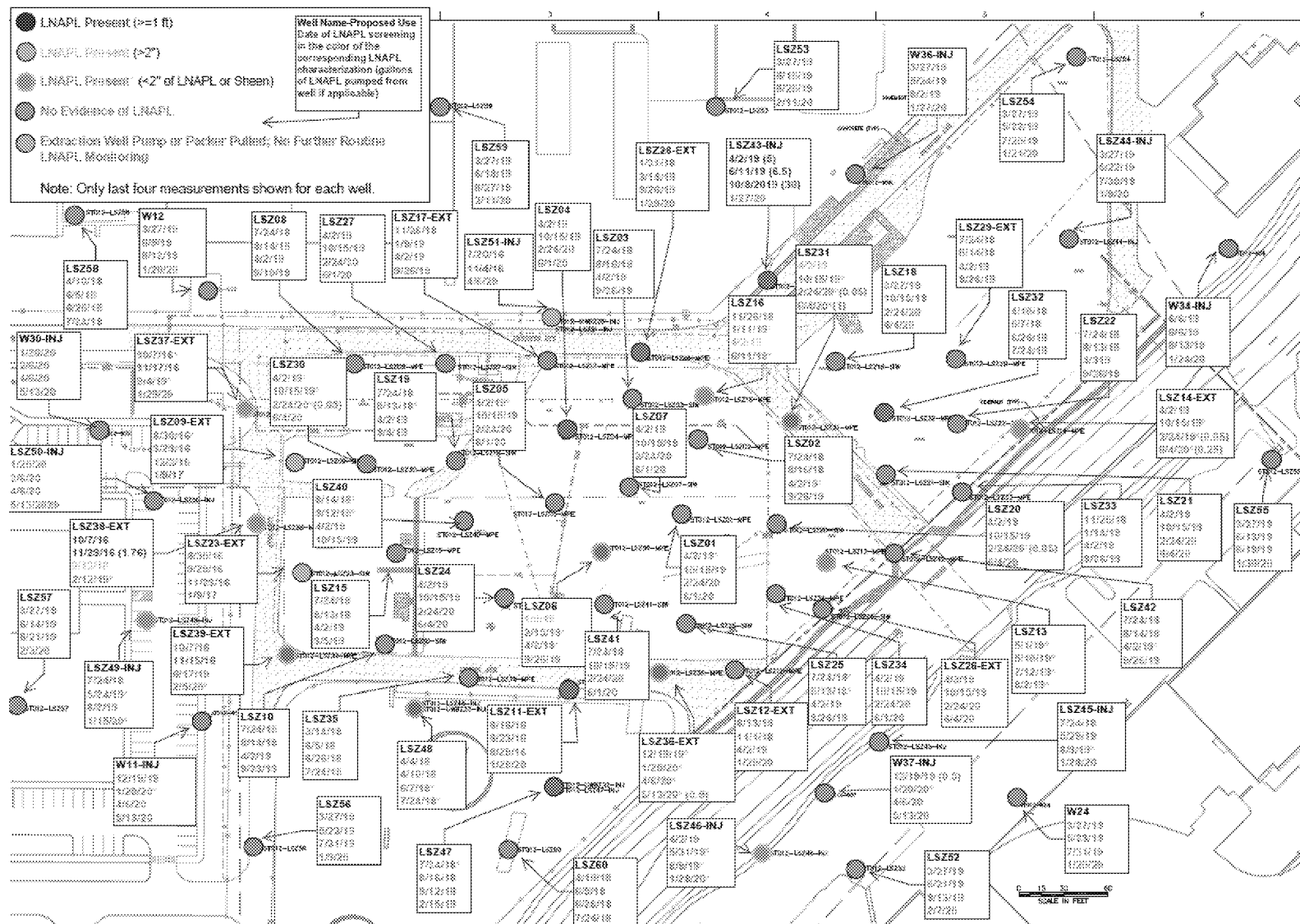
Upper Water Bearing Zone





LNAPL Monitoring/Removal Status

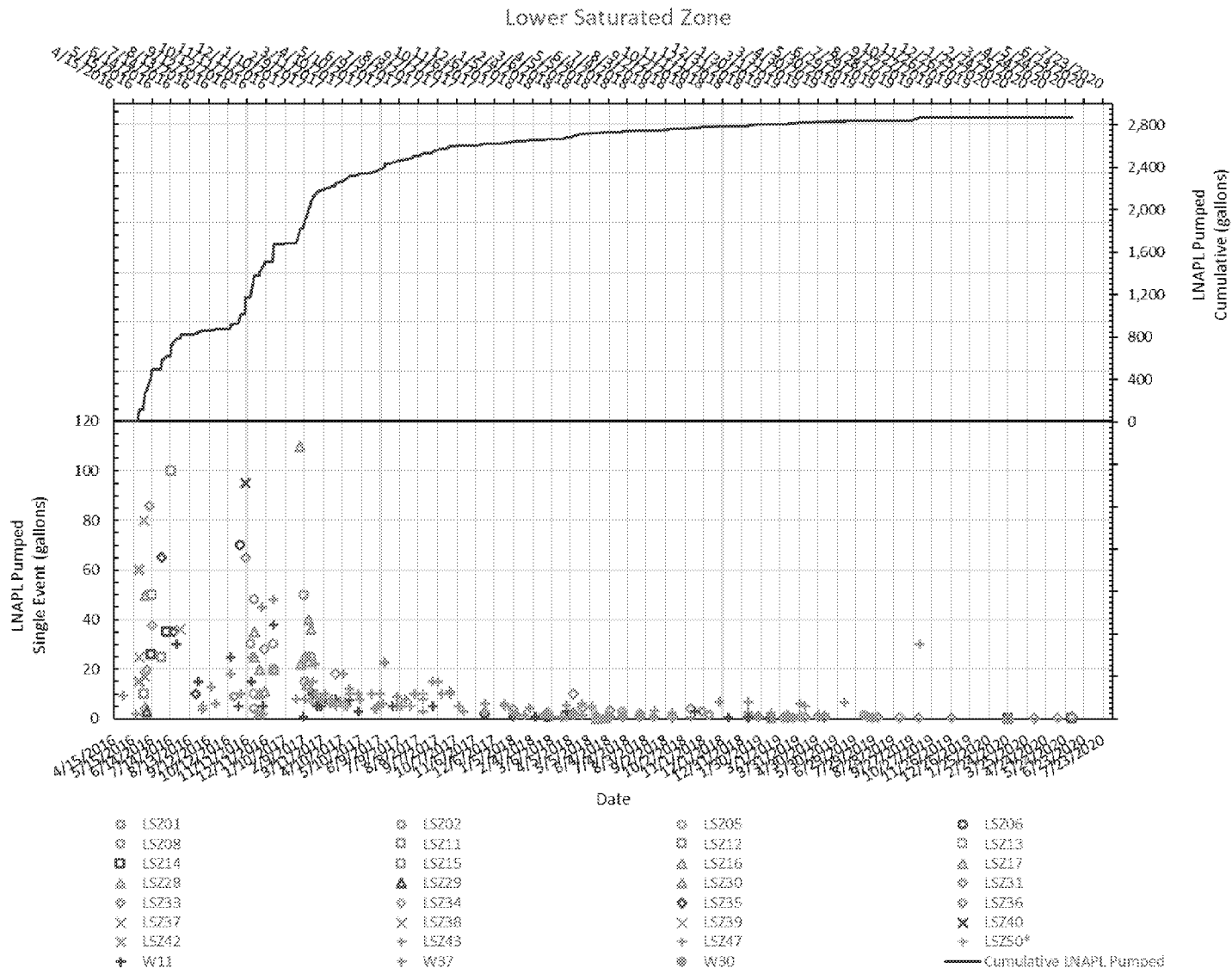
Lower Saturated Zone





LNAPL Monitoring/Removal

Lower Saturated Zone



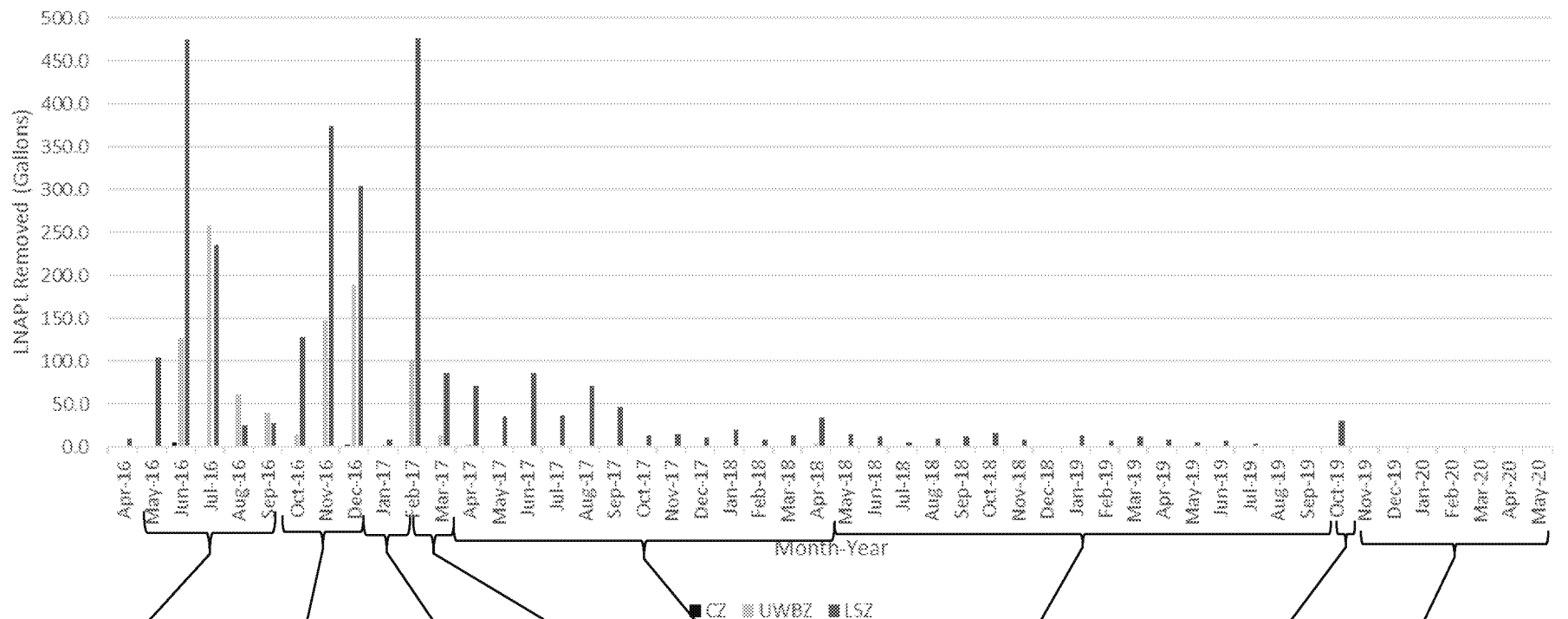
18 June 2020



ST012 LNAPL Removal Summary

- CZ – 7.75 gallons of LNAPL removed. None since Feb 2020
- UWBZ – 963 gallons of LNAPL removed. None since Apr 2019
- LSZ – 2,876 gallons of LNAPL removed. 1.25 since May 2020 (LSZ14 and LSZ31)

Monthly LNAPL Removed in Each Zone



Removal
following initial
eductor
removals

18 June 2020

Removal
following
remaining
eductor
removals

Diminished
removal
due to
pump
failure

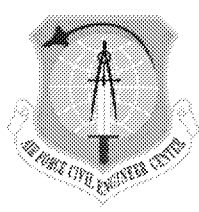
Recovery
following
pump
replacement

<100 gal/mo

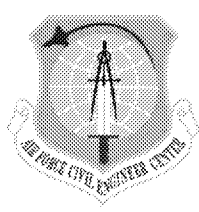
<20 gal/mo

30 gal from
LSZ43
during pump
maintenance

<1 gal/mo



Preliminary Second Quarter Groundwater Sampling Results

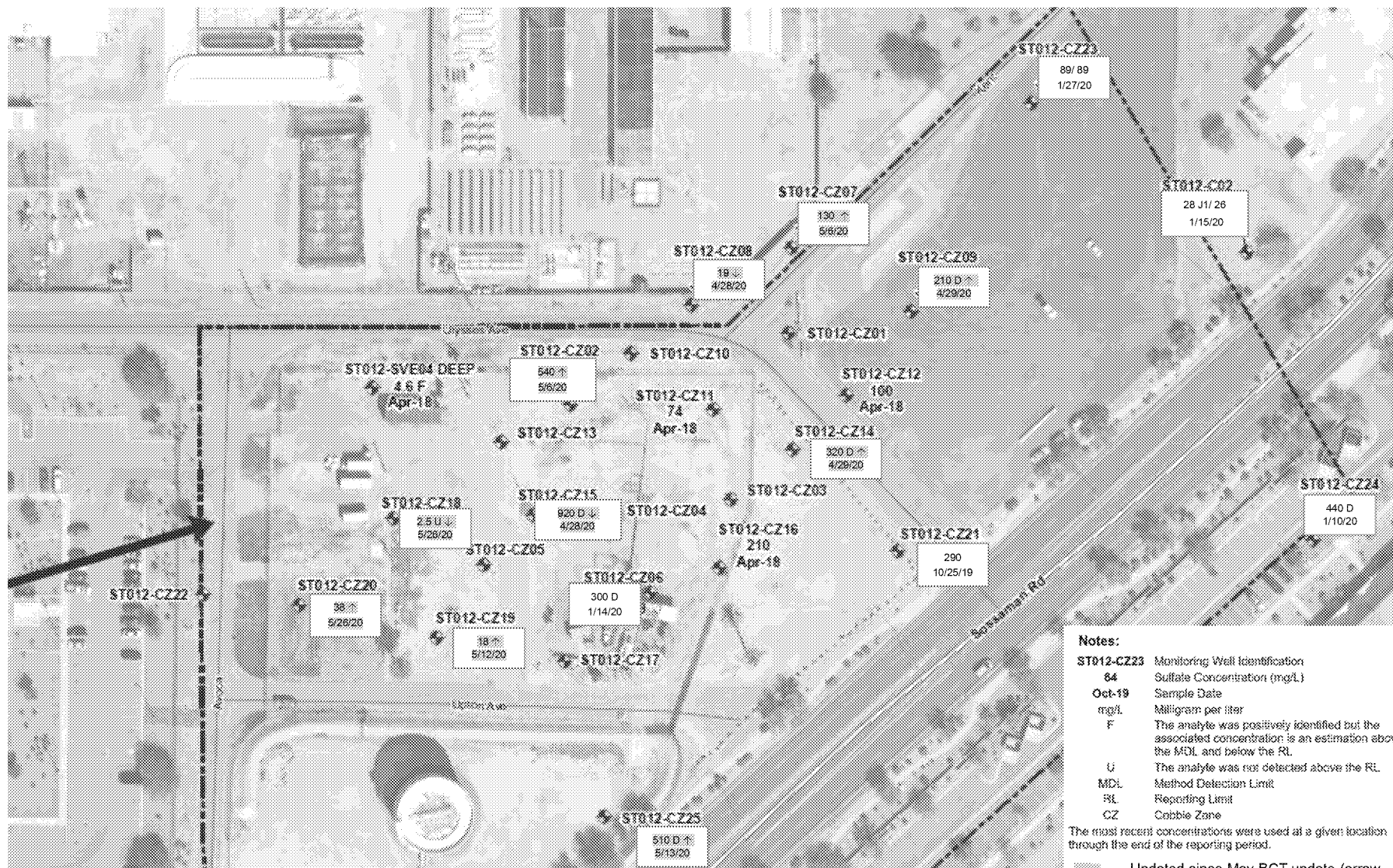


Sampling Summary

- **Sampling includes:**
 - Extraction Wells
 - Injection Wells (where injections took place)
 - Monitoring Wells (in areas where injections took place)
 - Perimeter Wells



Site ST012 Sulfate (mg/L) in CZ for Q2 2020



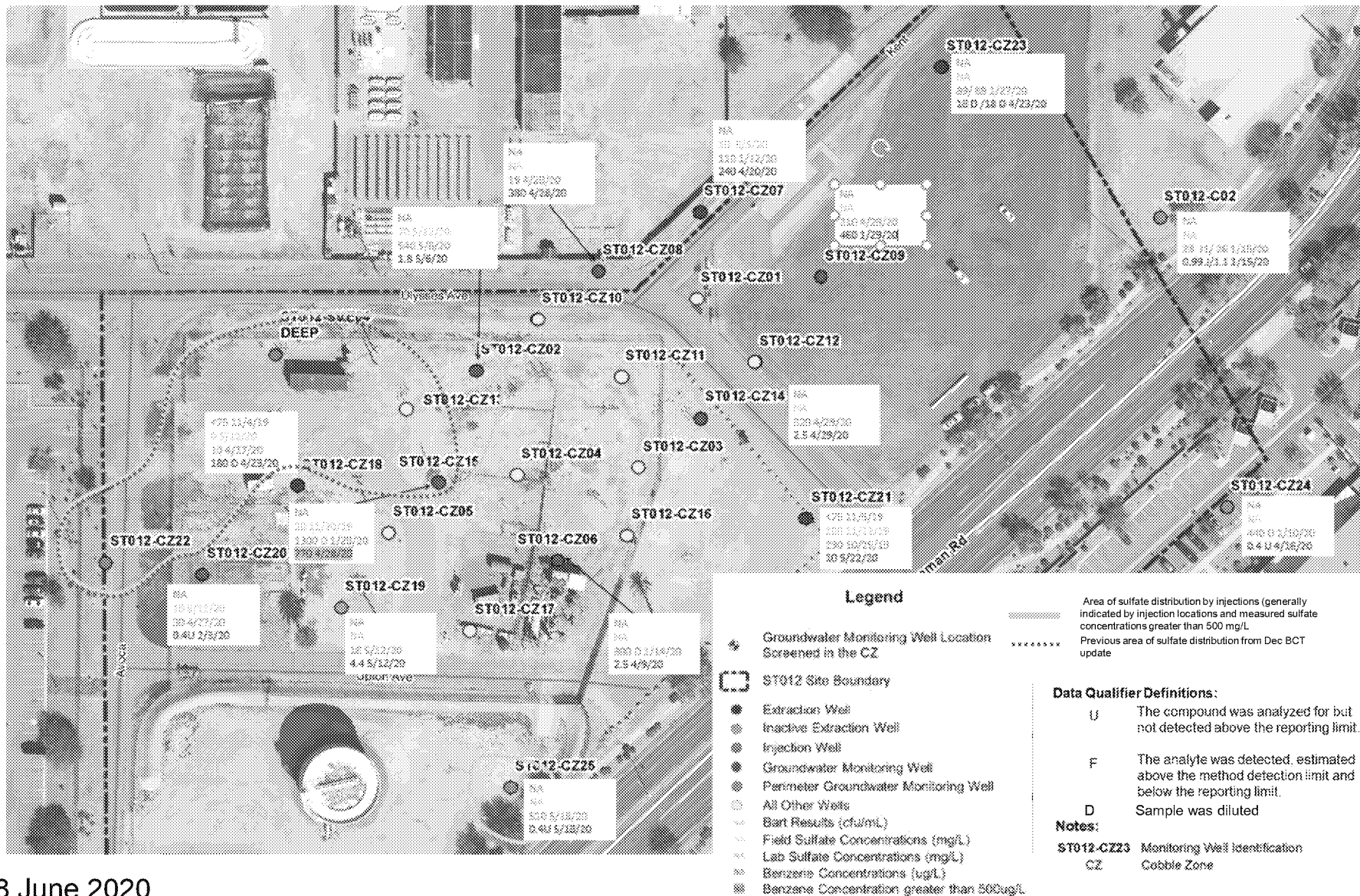
18 June 2020

D Sample was diluted

Updated since May BCT update (arrow indicates direction of change from previous result)



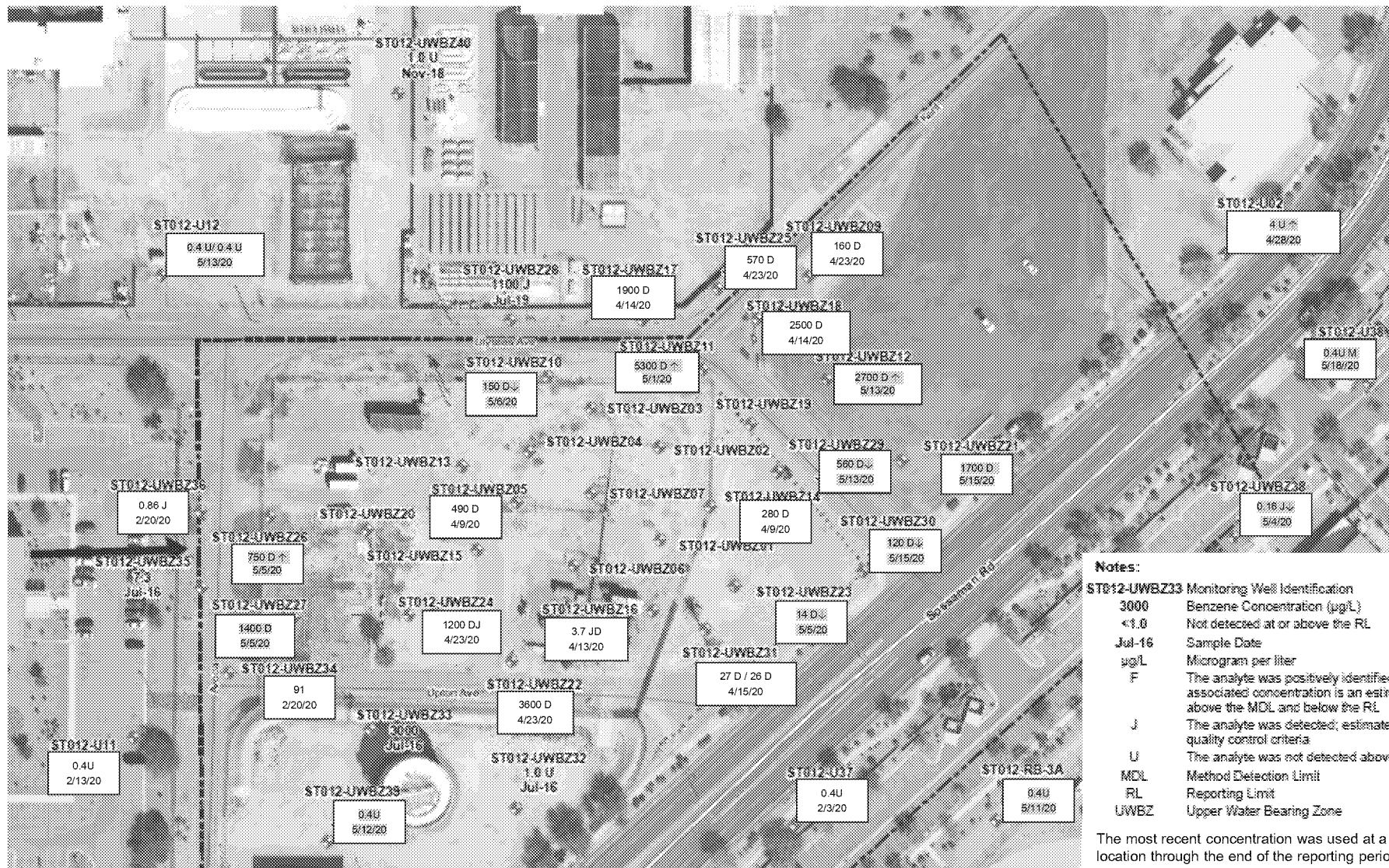
EBR Treatment Area in CZ for Q2 2020

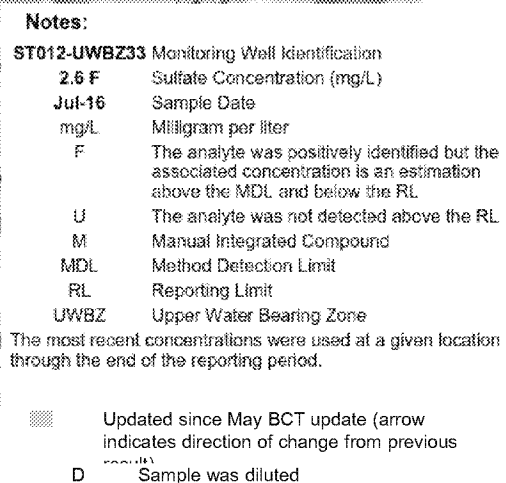
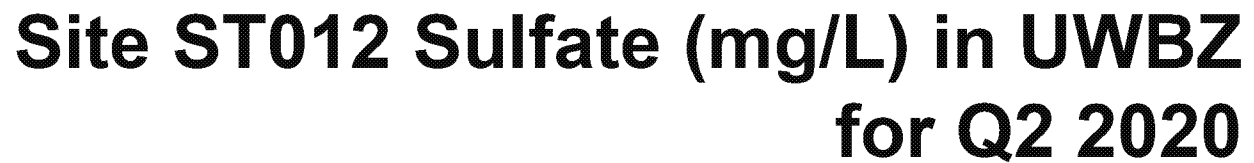


18 June 2020



Site ST012 Benzene ($\mu\text{g/L}$) in UWBZ for Q2 2020

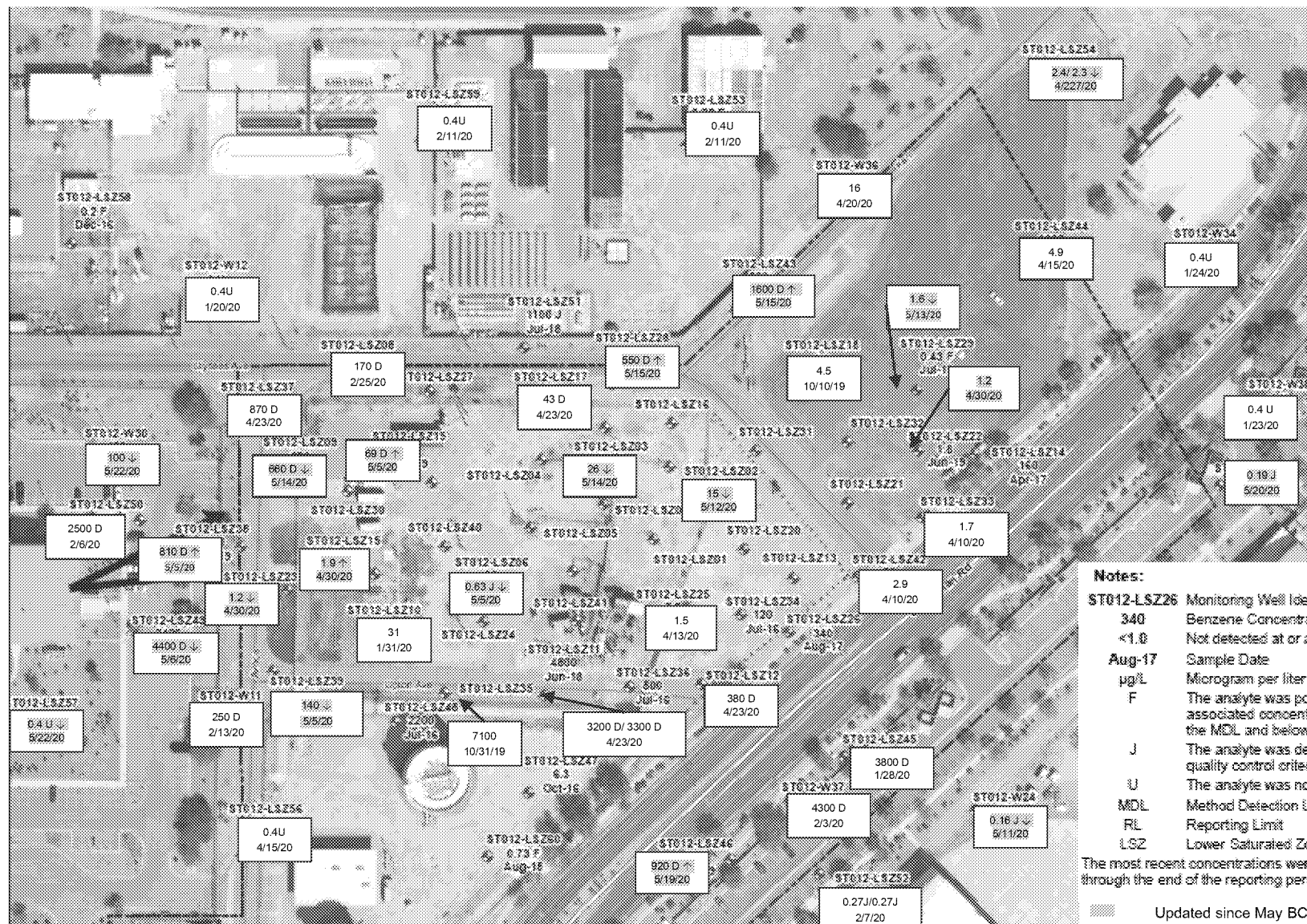








Site ST012 Benzene ($\mu\text{g/L}$) in LSZ for Q2 2020



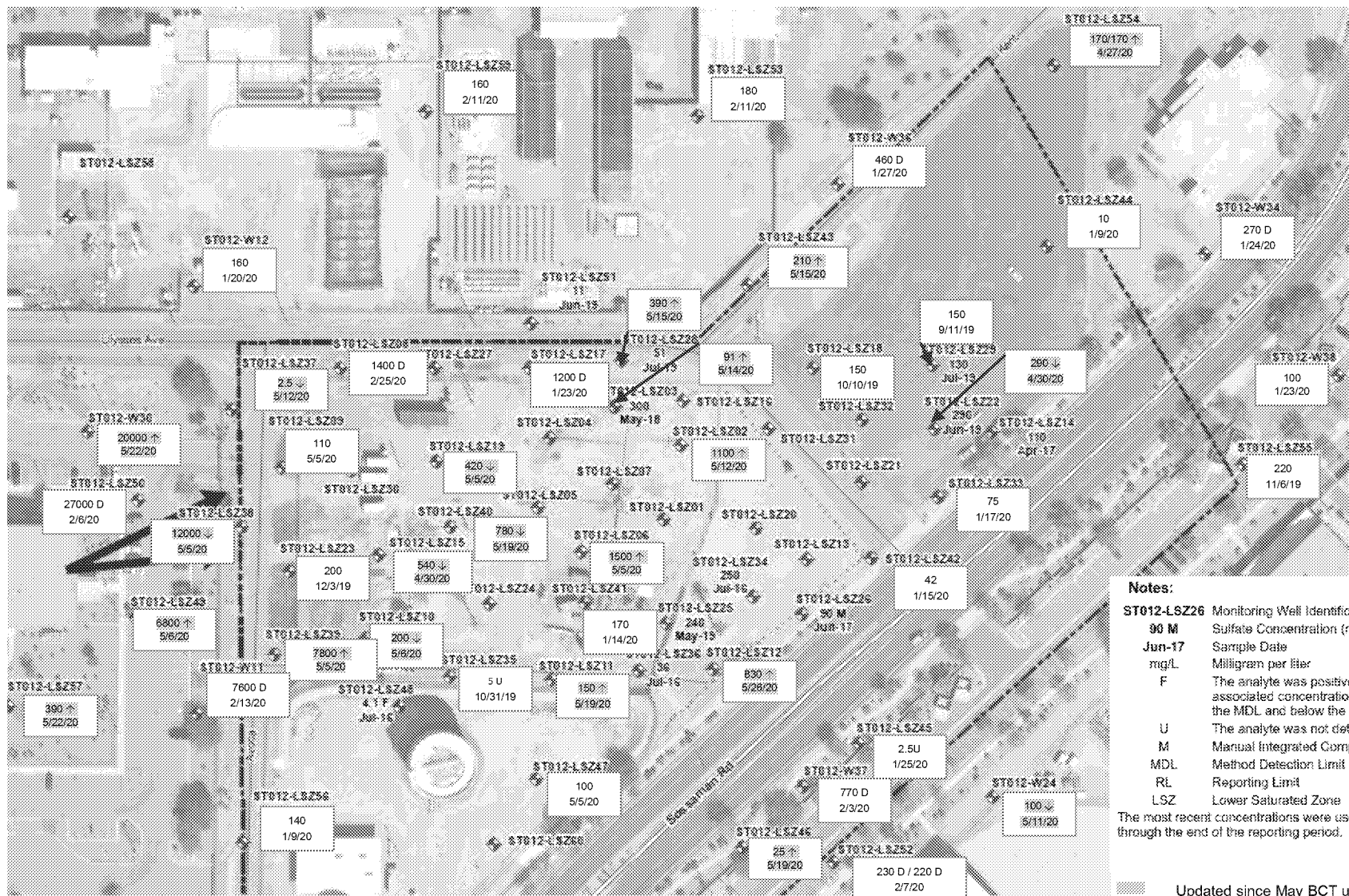
18 June 2020

D Sample was diluted

Updated since May BCT update (arrow indicates direction of change from previous result)



Site ST012 Sulfate (mg/L) in LSZ for Q2 2020





EBR Treatment Areas in LSZ for Q2 2020

Supplemental Injections planned in June-July::

- LSZ28 (3 tons)
- LSZ35 (3 tons)
- W37 (1 ton)
- LSZ45 (1 ton)

Area of sulfate distribution by injections (generally indicated by injection locations and measured sulfate concentrations greater than 500 mg/L).
Previous area of sulfate distribution from Dec BCT update

Data Qualifier Definitions:

- U The compound was analyzed for but not detected above the reporting limit.
- F The analysis was detected, estimated above the method detection limit and below the reporting limit.
- D Sample was diluted for analysis

Notes:
ST012-LSZ Monitoring Well Identification
LSZ Lower Saturated Zone

Legend

- Groundwater Monitoring Well Location Screened in the LSZ
- ST012 Site Boundary
- Extraction Well
- Inactive Extraction Well
- Injection Well
- Groundwater Monitoring Well
- Perimeter Groundwater Monitoring Well
- All Other Wells
- Bart Results (cfu/mL)
- Field Sulfate Concentrations (mg/L)
- Lab Sulfate Concentrations (mg/L)
- Benzene Concentrations (ug/L)
- Benzene Concentration greater than 500ug/L



Analysis for Benzene Degraders



Site ST012 Biological Testing

- **First set of BioTraps[®] pulled out from UWBZ26, UWBZ27, LSZ38, and LSZ39 on 30 Mar 2020**
 - **Both sets came out, second set was immediately redeployed**
- **Second set of BioTraps[®] pulled out from UWBZ26, UWBZ27, LSZ38, and LSZ39 on 20 Apr 2020**
- **C¹³ analysis of both sets in phospholipid fatty acids (PLFA) and dissolved inorganic carbon (DIC).**
- **QuantArray Petroleum analysis.**
- **C¹³ results are still pending**



Pilot Study Injection/Extraction Update



Site ST012 Extraction System Performance

Extraction Well	Calculated Average Extraction Rate in Period gpm	Maximum Temperature Since May 2018 °F	Most Recent Temperature °F	Cumulative Extraction Since May 2018 gallons	Note
ST012-CZ07	0.0	175	140	5,449,470	
ST012-CZ18	Off	136	126	3,019,867	Extraction stopped due to sulfate presence (Oct 2019)
ST012-CZ19	NA		103		Eliminated as an extraction well by FVM#7
ST012-CZ21	0.0	150	115	452,498	Totalizer reading suspect. Pump shut down due to low concentrations.
ST012-CZ23	7.0	114	102	935,927	Motor replaced
CZ Subtotal				9,857,763	
ST012-UWBZ21	18.7	170	164	638,328	Submersible installed but only runs for a few minutes/day (high temp)
ST012-UWBZ22	10.80	146	126	482,337	Pneumatic plugged, runs intermittently
ST012-UWBZ25	7.0	168	165	966,452	
ST012-UWBZ26	Off	133	114	2,408,709	Extraction stopped due to sulfate presence (Sep 2019)
ST012-UWBZ27	Off	128	94	130,011	Extraction stopped due to sulfate presence (May 2019)
ST012-UWBZ30	Off	172	128	2,527,610	Submersible installed
UWBZ Subtotal*				8,421,880	
ST012-LSZ09	Off	140	130	2,748,461	Extraction stopped due to sulfate presence (Oct 2019)
ST012-LSZ11	9.2	141	97	5,683,660	
ST012-LSZ12	5.8	130	99	3,322,869	
ST012-LSZ23	Off	113	94	3,638,934	Extraction stopped due to sulfate presence (Aug 2019)
ST012-LSZ28	---	162	165	23,131	Intermittent pumping for warm makeup water.
ST012-LSZ29	NA	>170		17	Eliminated as an extraction well by FVM#7
ST012-LSZ37	NA	132	90	6,706,323	Extraction stopped to avoid pulling sulfate from BioTrap locations
ST012-LSZ38	Off	160	90	941,898	Extraction stopped due to sulfate presence (Aug 2019)
ST012-LSZ39	Off	92	78	1,250,933	Extraction stopped due to sulfate presence (May 2019)
ST012-LSZ43	3.3	150	142	1,457,021	
ST012-UWBZ28/LSZ51	NA	146	128	2,536,868	Extraction stopped (Aug 2019), changed to injection end of subphase 2
W36	NA	81	81	386,615	Only used for make up water for sulfate mixing
LSZ Subtotal*				27,041,681	
Total of Wells	61.8			45,707,939	
Treatment System	39.1			37,422,157	

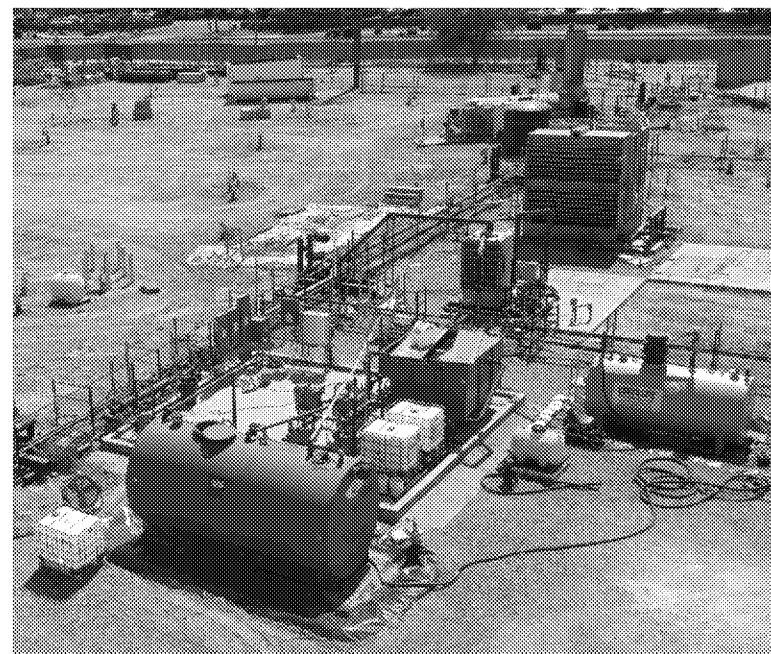
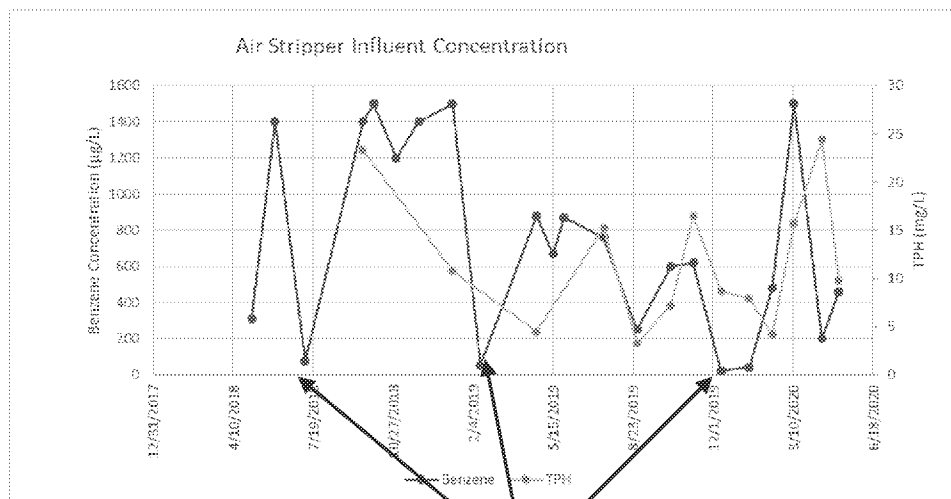
Data is preliminary

* Includes 1/2 of ST012-UWBZ28/LSZ51



Site ST012 Extraction System Performance

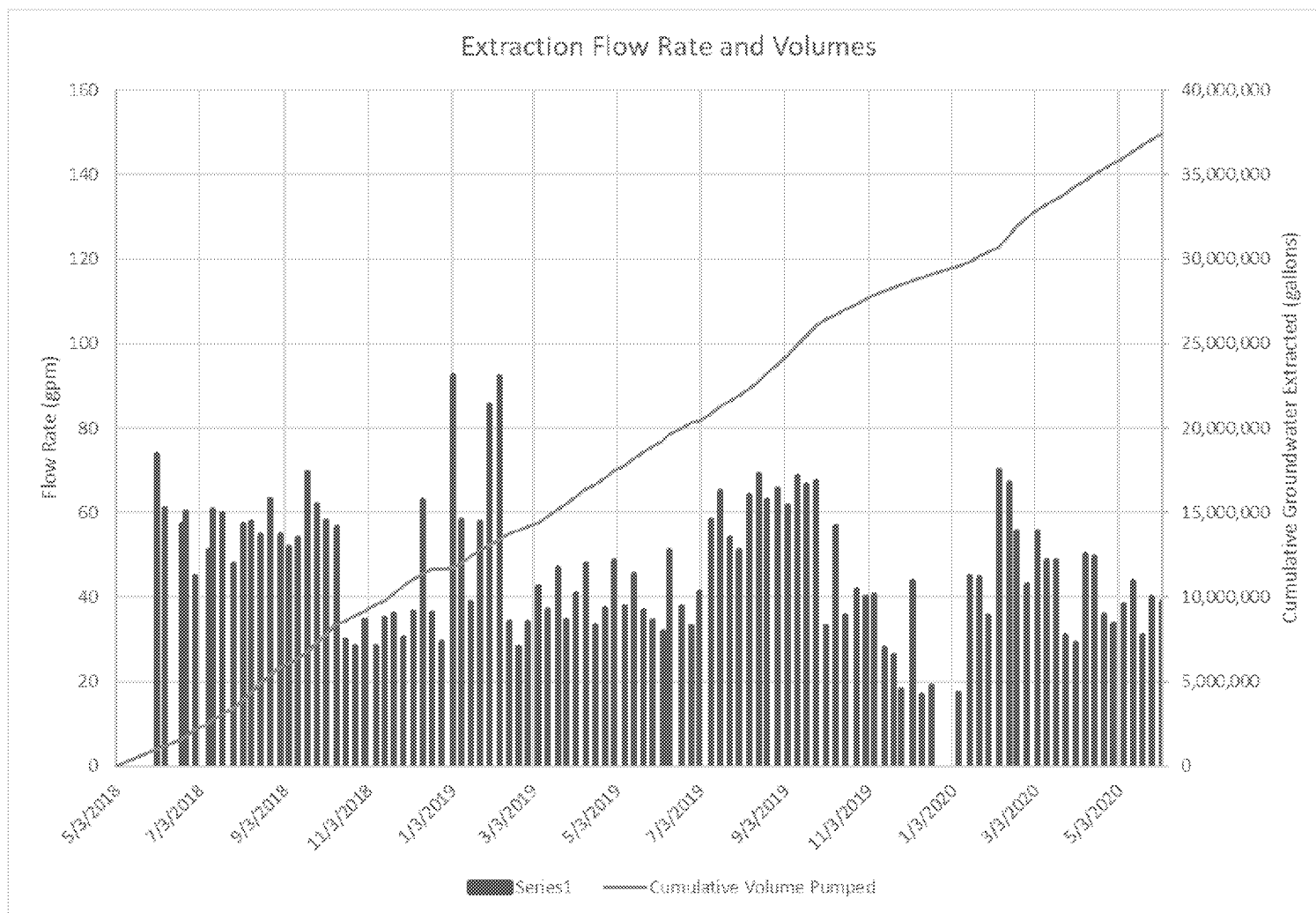
- No LNAPL has been recovered since extraction started up (oil-water separator bypassed based on City of Mesa permit modification)
- Extraction pumps UWBZ21 and UWBZ22 pumping intermittently
- CZ18, CZ21, UWBZ26, UWBZ27, UWBZ30, LSZ09, LSZ23, LSZ29, LSZ37, LSZ38, and LSZ39 turned off due to sulfate presence and SIP testing
- Benzene air stripper influent increased to 460 $\mu\text{g/L}$ for May sample (June not yet available). TPH concentration decreased.





Site ST012 Extraction System Performance

- Overall Extraction Rates and Cumulative Volume Extracted

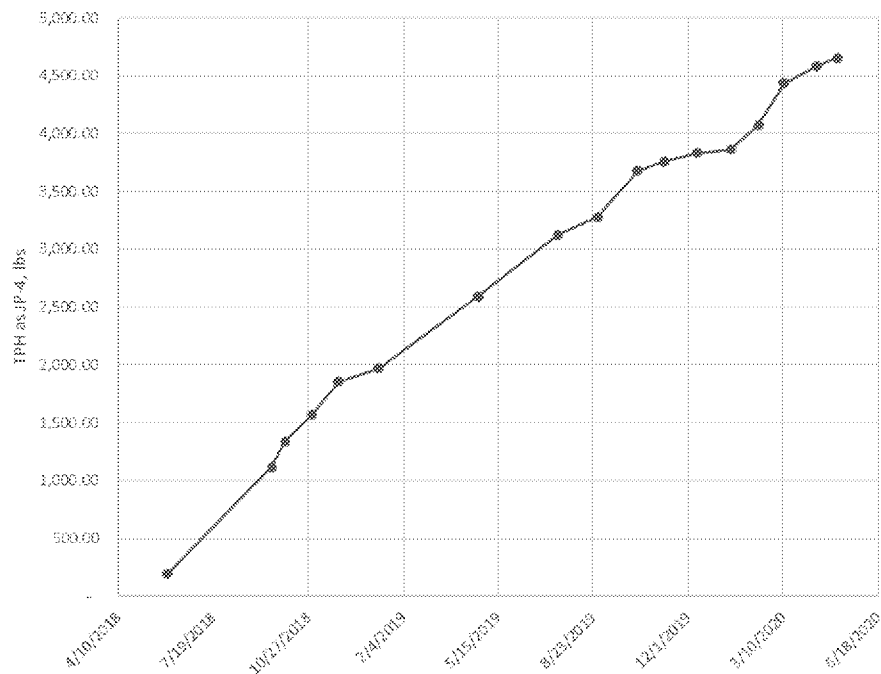




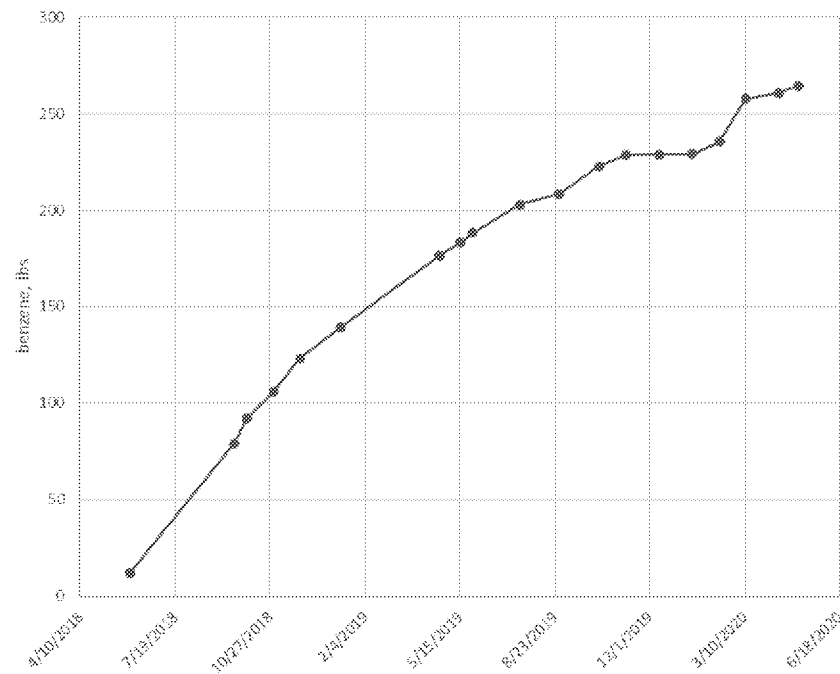
Site ST012 Extraction System Performance

- Estimated Mass Removal by Extraction

Total TPH as JP-4 extracted



Total benzene extracted





Site ST012 Sulfate Field Screening

Date	Sulfate Concentration (mg/L)																
	CZ02	CZ03	CZ05	CZ10	CZ13	CZ16	CZ18	CZ07	CZ20	CZ21	UWBZ15	UWBZ17	UWBZ21	UWBZ22	UWBZ24	UWBZ26	UWBZ27
10/29/2019	90	80	80	100	100	110	80	70	80	100	120	---	90	80	0	100	100
11/5/2019	90	---	---	---	---	---	100	---	60	70	---	---	100	---	0	110	---
11/12/2019	---	---	---	---	---	---	---	80	---	100	110	---	---	130	---	100	90
11/20/2019	120	140	20	240	0	210	650	3000	380	OFF	100	---	20	0	700	600	480
11/26/2019	140	---	---	---	---	---	30	---	10	Off	---	---	Off	---	450	500	---
12/3/2019	---	---	---	---	---	---	---	100	---	off	130	---	---	10	---	ERROR	350
12/10/2019	120	---	---	---	---	---	140	---	110	off	---	---	40	---	100	off	---
12/17/2019	---	---	---	---	---	---	---	100	140	off	140	---	---	40	---	off	300
1/8/2020	130	---	---	---	---	---	145	---	140	off	---	140	50	---	100	off	---
1/14/2020	---	---	---	---	---	---	---	130	---	off	20	---	---	Error00	---	off	40
1/21/2020	340	---	---	---	---	---	20	---	80	off	---	180	100	---	80	off	---
1/27/2020	---	---	---	---	---	---	---	120	---	off	50	---	---	100	---	off	40
2/4/2020	400	---	---	---	---	---	90	---	120	off	---	210	140	---	80	off	---
2/11/2020	---	---	---	---	---	---	---	100	---	Off	70	---	---	60	---	injecting	50
2/18/2020	300	---	---	---	---	---	80	---	100	off	---	100	100	---	1350	off	---
2/25/2020	---	---	---	---	---	---	---	60	---	off	130	50	---	30	---	BioTrap	100
3/2/2020	300	---	---	---	---	---	70	---	80	off	---	60	80	---	1200	off	---
3/10/2020	---	---	---	---	---	---	---	50	---	off	100	50	---	50	---	BioTrap	biotrap
3/17/2020	250	---	---	---	---	---	60	---	50	off	---	20	40	---	800	off	---
3/24/2020	---	---	---	---	---	---	---	60	---	off	80	30	---	40	---	BIOTrap	BioTrap
4/1/2020	220	---	---	---	---	---	40	---	40	off	---	10	20	---	400	off	---
4/7/2020	---	---	---	---	---	---	---	10	---	off	140	50	---	20	---	BIOTrap	BioTrap
4/14/2020	60	---	---	---	---	---	0	---	40	off	---	70	90	---	40	off	---
4/22/2020	---	---	---	---	---	---	---	10	---	Off	130	80	---	30	---	BIOTrap	BioTrap
4/27/2020	80	---	---	---	---	---	10	---	30	off	---	90	50	---	40	off	---
5/5/2020	---	---	---	---	---	---	---	10	---	Off	100	90	---	40	---	BIOTrap	BioTrap
5/12/2020	70	---	---	---	---	---	0	---	10	off	---	70	20	---	30	off	---
5/19/2020	---	---	---	---	---	---	---	20	---	Off	50	20	---	40	---	BIOTrap	BioTrap
5/26/2020	200	---	---	---	---	---	30	---	60	off	---	0	10	---	0	off	---
6/3/2020	---	---	---	---	---	---	---	0	---	Off	20	20	---	40	---	BIOTrap	BioTrap

CZ07

Screening location is an extraction location

CZ20

Screening location is a monitoring well

CZ18, CZ21, UWBZ26, and UWBZ27 extraction shut down.

Suspect field screening results in October and November not included



Site ST012 Sulfate Field Screening

	Sulfate Concentration (mg/L)																	
Date	WVBZ28/LSZ	UWBZ30	LSZ09	LSZ10	LSZ11	LSZ12	LSZ15	LSZ19	LSZ23	LSZ35	LSZ37	LSZ38	LSZ39	LSZ40	LSZ43	LSZ44	LSZ47	W30
10/29/2019	off	100	70	80	90	90	70	90	70	100	80	90	100	80	90	80	0	100
11/5/2019	off	70	90	90	---	70	---	---	90	---	230	60	80	60	---	---	---	---
11/12/2019	---	80	90	100	---	---	---	---	90	---	150	70	---	70	---	---	0	100
11/20/2019	OFF	OFF	790	470	120	2000	630	300	720	4000	400	2000	900	230	OFF	540	0	300
11/26/2019	off	off	650	350	---	600	---	---	off	---	530	460	---	90	---	---	---	100
12/3/2019	---	off	320	370	360	---	---	---	130	---	60	1060	---	200	---	---	0	-
12/10/2019	off	off	700	350	---	470	---	---	off	---	100	800	480	570	---	---	---	---
12/17/2019	---	off	310	370	200	---	---	---	off	---	120	750	---	550	---	---	0	130
1/8/2020	off	off	300	410	---	350	---	---	off	---	100	770	450	520	---	---	---	160
1/14/2020	---	off	80	330	370	---	---	---	off	---	20	450	---	124	---	---	0	---
1/21/2020	off	off	30	340	---	460	---	---	z	---	70	320	230	680	---	---	---	---
1/27/2020	---	260	4000	310	3530	---	---	---	off	---	---	210	---	660	---	---	500	200
2/4/2020	off	---	400	300	---	360	---	---	off	---	420	370	200	150	---	---	---	---
2/11/2020	---	400	30	40	420	0	---	---	off	---	---	300	---	680	---	---	0	180
2/18/2020	off	---	50	80	---	220	---	---	off	---	430	240	160	500	---	---	---	---
2/25/2020	---	440	40	240	440	---	---	---	off	---	---	Bio Trap	---	700	---	---	0	80
3/2/2020	off	---	40	250	---	200	---	---	off	---	400	Bio Trap	120	600	---	---	---	---
3/10/2020	---	380	50	---	300	---	---	---	off	---	---	Bio Trap	---	490	---	---	0	70
3/17/2020	off	off	---	200	---	200	---	---	off	---	300	Bio Trap	Biotrap	430	---	---	---	---
3/24/2020	---	360	50	---	200	---	---	---	off	---	---	Bio Trap	---	450	---	---	0	70
4/1/2020	off	off	---	120	---	150	---	---	off	---	200	Bio Trap	Biotrap	350	---	---	---	---
4/7/2020	---	620	140	---	120	---	---	---	off	---	---	Bio Trap	---	200	---	---	0	20
4/14/2020	off	off	---	180	---	680	---	---	off	---	60	Bio Trap	Biotrap	760	---	---	---	---
4/22/2020	---	590	120	210	130	---	---	---	off	---	---	Bio Trap	---	690	---	---	0	20
4/27/2020	off	off	---	200	---	600	---	---	off	---	80	Bio Trap	Biotrap	650	---	---	---	---
5/5/2020	---	600	110	200	100	---	---	---	off	---	---	Bio Trap	---	600	---	---	100	10
5/12/2020	off	off	---	170	---	600	---	---	off	---	100	Bio Trap	Biotrap	580	---	---	---	---
5/19/2020	---	OFF	80	60	40	---	---	---	off	---	---	Bio Trap	---	530	---	---	80	0
5/26/2020	off	off	---	210	---	740	---	---	off	---	90	Bio Trap	Biotrap	900	---	---	---	---
6/3/2020	---	off	100	180	20	---	---	---	off	---	---	Bio Trap	---	700	---	---	50	20

	Screening location is an extraction location
	Screening location is a monitoring well

UWBZ30, UWBZ28/LSZ51, LSZ09, LSZ23, LSZ37, LSZ38 and LSZ39 extraction shut down.
 Suspect field screening results in October and November not included
 LSZ12 sulfate still increased



Site ST012 Path Forward Jun-Jul 2020

- **Continue SVE**
- **Continue pump repairs if necessary**
- **Pilot Study Implementation**
 - **Continue extraction and treatment**
 - **Receive SIP results (C¹³-PLFA and DIC)**
 - **Preparation of Pilot Study Implementation Report**
 - **Continue sulfate screening**
 - **Additional injections to replenish and expand sulfate distribution**
 - **UWBZ:**
 - UWBZ11, UWBZ17, UWBZ18 (continue pumping at UWBZ25)
 - UWBZ23 (continue pumping at UWBZ30)
 - UWBZ24 (continue pumping at UWBZ22)
 - UWBZ27
 - **LSZ:**
 - LSZ28 (continue pumping at LSZ43)
 - LSZ35 (continue pumping at LSZ11)
 - W37, LSZ45 (continue pumping at LSZ12)

Air Force Civil Engineer Center



***2020 BCT
MEETINGS/CONFERENCE
CALLS SCHEDULE
DELIVERABLE TRACKING***

**BCT Conference Call
18 June 2020**

Air Force Civil Engineer Center



BCT GENERAL UPDATE AND ACTION ITEMS

**BCT Conference Call
18 June 2020**